RHYTHMS/COVAD
EXHIBIT 2.10

# High Bandwidth Services Line Sharing Non-Recurring Cost Analysis

## Sponsored by Covad Communications Company and Rhythms Links, Inc.

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## Introduction

This document describes the Covad Communications Company ("Covad") and Rhythms Links, Inc. ("Rhythms") analysis of high-bandwidth service nonrecurring costs for line sharing arrangements. The analysis examines the nonrecurring Long-Run Cost of providing Digital Subscriber Line ("DSL") services using the available high frequency spectrum of an in-service standard telephone line. This cost analysis provides non-recurring costs incurred by an efficient incumbent provider to provide unbundled network elements related to DSL services.

## General Assumptions

The analysis uses a forward-looking economic cost methodology to estimate the non-recurring costs incurred by an efficient service provider. As a result, the network consists of:

- Copper loop plant with no load coils, repeaters or excessive bridge taps;
- When fiber feeder is the economic choice, DSL-ready Digital Loop Carrier ("DLC") equipped with line cards that function as DSLAMs/splitters;[1]
- HTU muxes and ATM edge switches (possibly also ATM switches/ Optical Concentration Devices ("OCDs");
- Low profile wire wrap Main Distribution Frames ("MDFs");
- Legacy Operations Support Systems ("OSS") with clean databases;
- Electronic gateways with front end edits; and
- Efficient network operations with properly trained personnel.

In the DLC case, the analysis assumes a DLC equipped with the DSL electronics at the RT. The analysis develops costs for options with an ILEC- or a CLEC-provided RT line card. The non-recurring costs are calculated separately for home-run copper and fiber-fed DLC loops.

For ILEC-owned equipment such as the ILEC-owned line card all related Engineer, Furnish and Install (EF&I) labor activities are capitalized and their costs are recovered in recurring rates. Certain costs for activities required to activate and disconnect individual DSL circuits are circuit-specific and are properly recovered through non-recurring charges. All wiring towards the customer side of the NID is the responsibility of the customer and is not included.

DSL services use sufficiently advanced technologies so they can be operated as plug and play services and do not incur the expense of designed circuits, despite their high bit rate output. The DSL technologies only require testing in the case of service failure, the costs of which are recovered through maintenance expenses in recurring charges since the most likely cause of failure is outside plant parameters.

[1] For example, Lucent's AnyMedia, Alcatel's Litespan ADSL, and AFC's UMC1000.

The CLEC also requires access to loop makeup information to determine the suitability of a loop to provide DSL-based services. Access to loop makeup information is available electronically through properly managed legacy OSS such as LFACS, which have fields for the necessary data such as loop length, load coils, bridge tap information, etc. An efficient service provider should fully populate such legacy systems to deliver the required information and provide access to this information to CLECs via an electronic gateway.

Any activity that benefits future customers or multiple customers should be recovered in recurring charges, not non-recurring. As an example, installing an ILEC-owned plug-in card at the RT benefits more than one customer, so the cost of that activity should be recovered in recurring charges.

*Line conditioning refers to the activities needed to make a copper loop DSL capable.* Some activities include removing load coils and minimizing bridge taps. Non-recurring costs should reflect forward-looking economic costs.[2] A proper forward-looking analysis does not have load coils or excessive bridge taps, so the costs to remove them should be zero. In addition, ILECs have been upgrading their outside plant to support ISDN and universal service, and these costs are already reflected in recurring maintenance expenses. Simply put, line conditioning non-recurring charges should be zero.

## Calculations

The analysis identifies all necessary nonrecurring-cost-related steps that correspond to an efficient, forward-looking network architecture. The cost is calculated by taking the probability that step will happen, multiplied by the time required in minutes for one technician to do the task, multiplied by the labor rate of the technician. The probability function considers the probability that each cost activity will be incurred relative only to the specific task being studied. Therefore, while a technician might always, for example, need to be at the remote terminal to place a cross connection at that location, efficient work scheduling would frequently assign the technician multiple jobs at the same location in sequence. Therefore, the probability factor takes into account the percentage of time a technician will, for example, have already traveled to a given location to perform another related or unrelated task such as a retail order operation or to work the first line on a multiple line order. The cost for each activity is added up and finally a variable overhead factor is applied.

$$\text{Activity cost} = (\text{probability} \times \text{time} \times (\text{hourly labor rate}/60)$$
$$\text{Total cost} = \Sigma\ \text{activity cost} \times (1 + \text{variable overhead})$$

[2] *See* Federal Communications Commission Memorandum Opinion and Order in the Matter of the Section 271 Application of Ameritech Michigan to Provide In-Region, InterLATA Services in Michigan, CC Docket No. 97-137 (Aug. 19, 1997), at 296.

See analysis output for assumptions on work centers, times, and class of technicians.

Subject matter experts determined all default values. Activities specific to each element and beyond the ones mentioned above are discussed below.

## Analysis Operations

The analysis is a simple set of spreadsheets that outline the steps necessary to provision the various elements. Inputs that are reasonably likely to vary by state or based on prior state regulatory finding (such as the level of any variable cost markup, the percentage of staffed central offices and labor rates) are designed User Variable Inputs. User variable inputs are located on the bottom half of the "Results Summary" spreadsheet. Once changes are made to a User Variable Input, new results are calculated instantly and are displayed on the top portion of the 'Results Summary' spreadsheet.

## Conclusion

The Covad and Rhythms analysis provides forward-looking non-recurring cost that an efficient incumbent service provider will incur in providing DSL-related elements that are necessary to implement a line sharing arrangement. The costs are based on a forward-looking network and uses proper economic costing principles.

## Technical Reference

Certain core steps are necessary for each element and as a result appear throughout: for example, pulling and analyzing an order and travel time. This section discusses the common tasks as well as the unique steps for the various elements.

### *Common tasks*

Almost all elements have tasks that are common to many elements. These include, but are not limited to, the ones described below.

*Pull and analyze order* – This step may involve a technician sitting down at a terminal in the central office, typing in a few commands and pulling work order(s). Alternatively, it may reflect the technician simply picking up and reviewing a system generated list of orders/assignments for the day. The work order typically has much of the information needed to perform the tasks such as the location of the cable pair and the Connecting Facilities Arrangement (CFA) appearance. A trained and experienced technician can find the correct location for cross-connects very quickly.

*Install manual cross-connect* - This is where a technician makes a manual cross-connect. This could be in the CO on the MDF or in the field at the RT. The CO work typically involves a wire wrap gun, and the field cross connect uses a screwdriver and pliers at the binding post.

*Setting up for safety* - These practices are used in the field to do the work safely. It usually involves parking the truck carefully, setting up the safety cones, putting on the safety strobe, wearing a safety jacket and getting the proper tools.

*Teardown of safety setup* – This is the reverse of safety setup and includes the proper stowing of safety gear and tools.

*Travel to non-staffed central offices* – Occasionally the technician must travel to a non-staffed office where it is not cost-effective to have technicians on site.

*Travel within CO* – Special services circuits are typically on another distribution frame, often called the toll frame or Intermediate Distribution Frame (IDF). These frames may reside on another floor within a CO, and the technician must travel within floors to make the cross-connect.

*Close order* – After all work is complete, the technician sits down at a terminal in the central office and types in a few command to close the order. The OSSs then close the order throughout the systems.

## Nonrecurring Cost Element Descriptions

### Place and Remove Jumpers

This element reflect typical task times required to review order data, place or remove the type of frame jumper that would be required to connect two points on a frame (such as a splitter appearance to a line or switching port appearance). This is the work activity required to activate a line sharing arrangement for a home run copper loop.

### DSL line card @ RT – ILEC owned

Ordinarily an ILEC would own the line card at the RT and the cost of placing that card in the RT would be recovered in recurring rates because the labor associated with a capital asset should also be capitalized. Because, however, all end user lines will not be connected through DSL-capable line cards, the ILEC may need to dispatch a technician to connect the designated end user line to an appropriate card. In addition to the common activities, this element is simply the appropriate labor cost for an ILEC technician to connect the card in the RT. This is not done all the time since a line card is assumed to have four ports, and the first customer can be provisioned on the card. The other three (3/4=75%) may need to have their lines jumpered over to the CLEC line card.

### DSL line card @ RT – CLEC owned

If an ILEC owns the line card at the RT, the cost of placing that card in the RT should be recovered in recurring charges because the labor associated with a capital asset should also be capitalized. However, a CLEC may buy the line card and have the ILEC place it in the RT (e.g., virtual collocation at the RT). In addition to the common activities, this nonrecurring cost for this element is simply the appropriate labor cost for an ILEC technician to place the card in the RT.

Also, after placing a line card, the ILEC technician may need to run jumpers to get customers over to the CLEC line card. This is not done all the time since a line card is assumed to have four ports, and the first customer can be provisioned on the card. The other three (3/4=75%) may need to have their lines jumpered over to the CLEC line card.

### *Configure PVCs within a PVP*

CLECs may choose to purchase a group of Permanent Virtual Connections ("PVCs") called a Permanent Virtual Path ("PVP"). Within a PVP, CLECs may need to configure the PVC makeup. A technician can do this by simply typing a few commands at an ATM network terminal.

### *ATM Edge Switch / OCD Port*

In order to take its traffic from an ATM edge switch or ATM switch/OCD, the CLEC needs to obtain access to a port there. This is done by simply installing a line card in the ATM switch and creating a PVC in the ATM network. Ports are typically configured as DS-3 or OC-3. To disconnect, simply remove the PVC.

### *Fiber cross connect @ the FDF*

This is a bi-directional 2-fiber, fiber-to-fiber connection through the Fiber Distribution Frame ("FDF"). The unique activities with the 2-Fiber Entrance Facility consists of the time it takes to install the 2-fiber connectorized pig-tails (cross-connects) at the FDF cross-connect panel. The testing is assumed to take place – at the time of construction - remotely via an Intelligent OTDR system (e.g., Fiber-Check 5000 [FC-5000] type system). It is further assumed that data-basing of the system as well as the creation of the templates and inventory for the OTDR (FC-5000) system, and NMA surveillance OSS system are built at the time of construction. The Optical Time Domain Reflectometer ("OTDR") tests the fiber for open circuits.